

# FALCON & COMMODORE TROUBLESHOOTING

In this, the first part of a two-part Techstop series, we review some common problems, fitting hints and technical trivia relating to Falcons and Commodores. Most of these issues can also be applied to other makes and models.

## Torque To Yield bolts

A number of load carrying bolts on major suspension components on late model vehicles use a "Torque To Yield" (TTY) bolt. TTY bolts are designed to stretch to their elastic tolerance limit when torqued correctly to provide the correct clamping force to secure the relevant components.

These bolts provide a number of advantages for securing critical components. For the repair shop, they have one significant negative - they cannot be reused over and over. The reason for this is that they lose a certain amount of tensile strength when they are stretched and after each subsequent tightening they become weaker. For this reason manufacturers stipulate that they be replaced whenever loosened.



Some common applications for TTY bolts are:

- F & R control arm mounting bolts
- F & R cross member mounting bolts
- Heads studs
- Main and big end bolts

On VR - VT Commodores, the most common bolt in the suspension to be undone is the strut's clevis bolt that is a TTY. These bolts must be replaced whenever they are removed or loosened.

**Note:** to adjust the camber on these Commodore models, both clevis bolts have to be undone!

Above: The Clevis bolts or TTY bolts on a VR Commodore

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## Cradle Alignment

The VT Commodore has highlighted the importance of correct cradle or cross member alignment. This has been a common practice in front-wheel drive vehicles since they became popular in the early 80's. The main complaint resulting from incorrect cradle alignment in FWD's was torque steer and harmonics or vibration problems.

The common complaint from Commodore owners is that their vehicle has a pulling and/or tyre wear problem despite the car already having a wheel alignment, balance and rotation.

The simple use of a four-wheel aligner and a tape measure will generally reveal that the vehicle has:

- variance in the wheel base between sides
- a significant thrust angle in the rear
- a significant set back angle in the front

For corrective purposes, GM has two special alignment tools. For the front end, the part number is AU457, while for the rear, it is AU458. The alternative method is to use a trammel gauge (as used by panel shops for measuring chassis squareness) and in simple terms, centre and square up the vehicle's three major components - the chassis and front and rear cradles.

**Note: all of these bolts need to be replaced whenever they are loosened.**

They are not TTY bolts, as discussed earlier, but are "micro-encapsulated". This term describes a system where the bolt (in this instance) or nut has a chemical locking compound applied to its thread.

When the bolt or nuts are screwed together a chemical reaction occurs. The result is a bonding or locking of the bolt to nut. This reaction is only possible once and as a result the bolts need to be replaced each time they are loosened.

Pedders has available part numbers 5401 and 5403 (camber thrust and toe adjusters) for minor adjustment when cradle alignment is not enough or the vehicle has been lowered.

These kits are designed to be fitted to the inner pivots of the rear control arm.

In Techstop No 16, which dealt in depth about the release of the VR, we explained their use. Since

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their inception they have solved thousands of Commodore owners' tyre wear and handling problems.

We recently found a case where a particular car had a large problem with tow and thrust. Two kits were fitted; one in the inner, as it should be, and one in the outer.

The result was that the toe problem was fixed but at the cost of a new diff. The cause of the diff problem was that the massive toe change of 14mm was achieved by moving the wheel inboard, thus causing the drive shaft to bottom and apply a thrust loading into the diff housing.

The original problem was (as you guessed it) rear cradle alignment. Pedders always recommends that only one kit be fitted to the inner pivots. If a car has significant alignment problems and you cannot locate any other problem eg, bent cross member, bent control arm, or misaligned cradle and you choose to use two kits, always set the outer kit to full camber change and adjust the inner for the toe/thrust adjustment.

## **Camber Adjustment for VR-on Commodore**

The VR, VS & VT Commodore have an adjusting bolt mounted at the strut clevis. This bolt screws through the upright and creates a force against the strut. The upper clevis hole is slotted in the strut and this allows for adjustment.

From field experience it has been found that this bolt can become seized when it is being adjusted to reduce negative camber.

The cause of the problem is the vehicle's weight. With the vehicle set up on a wheel aligner, a significant side load is pushing in against the clevis bolts. This means that once the clevis bolts are loosened, the adjuster bolt carries a very high compression load and becomes very tight. In fact it is not uncommon for this bolt to break when being adjusted.

The trick with this is when the camber needs to be adjusted toward the positive, jack the vehicle up, loosen both clevis bolts and screw the bolt in to provide excessive positive camber. Then lower and settle the vehicle and slowly unscrew the adjuster until the desired reading is achieved. Replace and re-tighten clevis bolts to recommended torque specification.



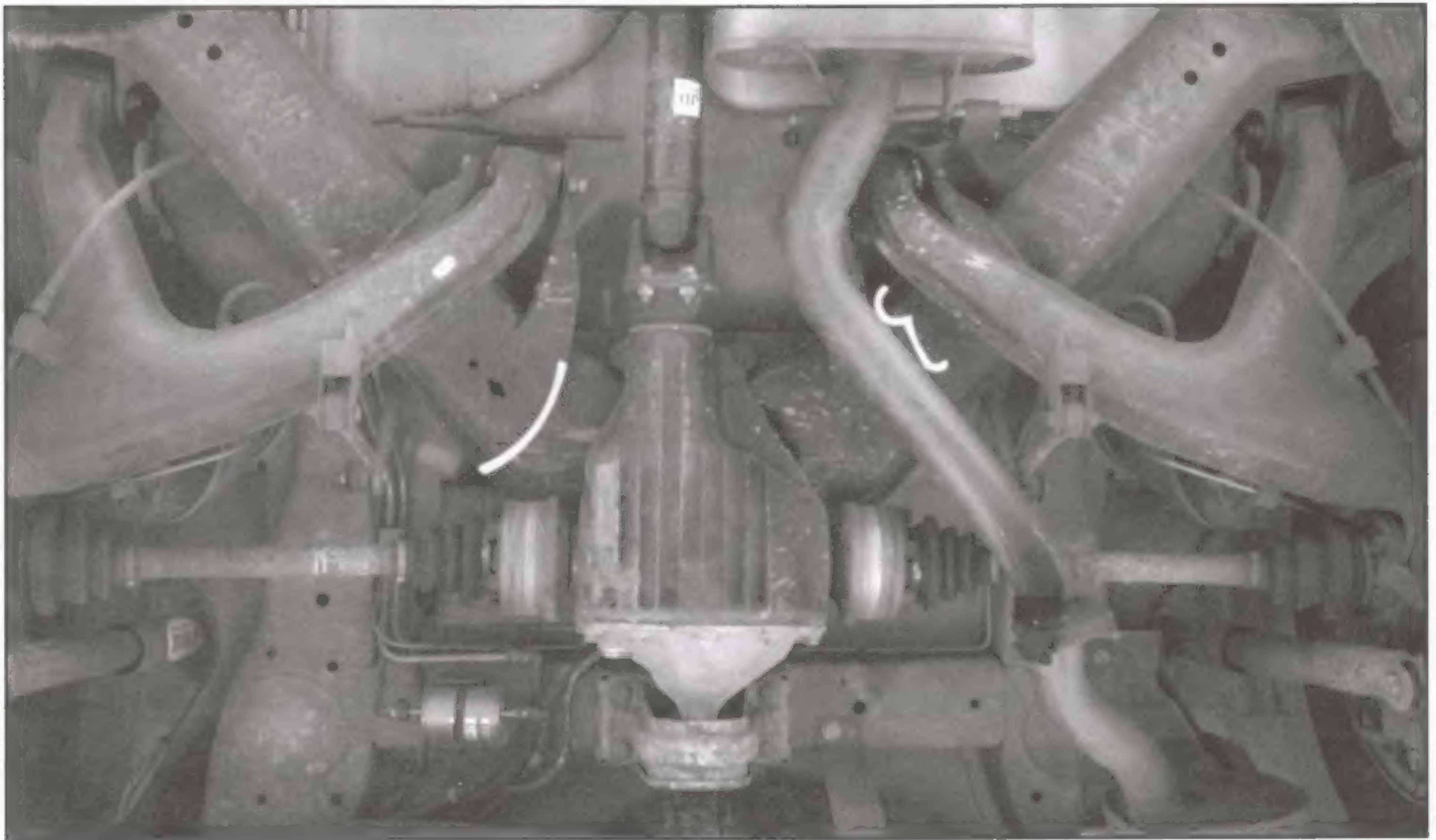
## Cracking cross member

There have been isolated instances of the IRS cross member cracking and eventually breaking on VR & VS models. The failure occurs on the structural cross member between the trailing arm's inner pivot mounting and the differential carrier mounting bolts.

The symptoms of this problem can include:

- A click or creaking noise as the vehicle accelerates or brakes
- Rear steer symptom similar to a broken rear leaf
- Severe thumping or banging
- Rear end steps out under acceleration
- Severely out of specification rear toe and camber
- Loss of drive

If the cross member breaks completely, the result can be that the axle is pulled out of the differential carrier.



**This image shows the potential fatigue points of the IRS cross member in a VT Commodore.**



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